2010

Sleep Well to Stay Safe: Ready for Primetime?

Mihai C. Teodorescu

Mariana Szklo-Coxe
Old Dominion University

Original Publication Citation

Teodorescu, M. C., & Szklo-Coxe, M. (2010). Sleep well to stay safe: Ready for primetime? *Sleep, 33*(5), 577-578. doi:10.1093/sleep/33.5.577

COMMENTARY

Sleep Well to Stay Safe: Ready for Primetime?

Commentary on Kling et al. Sleep problems and workplace injuries in Canada. SLEEP 2010;33:611-618.

Mihai C. Teodorescu, MD[1,2]; Mariana Szklo-Coxe, PhD, MHS[3,4]

[1]Department of Medicine, University of Wisconsin School of Medicine and Public Health, Madison, WI; [2]William S. Middleton Memorial VA Hospital, Madison, WI; [3]School of Community and Environmental Health, College of Health Sciences, Old Dominion University, Norfolk, VA; [4]Division of Sleep Medicine, Department of Internal Medicine, Eastern Virginia Medical School, Norfolk, VA

WORKPLACE INJURIES ARE A MAJOR PUBLIC HEALTH PROBLEM, CONSTITUTING LARGE DIRECT AND INDIRECT COSTS. MORE THAN A QUARTER OF THE working-age population in Canada who report having an activity-limiting injury (one third of men and one fifth of women) sustain their most serious injury at work.[1] In the US, the ten workplace injuries and illnesses responsible for the highest disability burden (and representing nearly 90% of its entire cost burden) amounted to over $52 billion dollars in direct worker compensation cost for the year 2007 alone.[2] Sleep disturbances are increasingly acknowledged as predictors or correlates of poor work performance and productivity[3] and occupational injuries.[4] Although occupational studies have historically focused on sleepiness[4] or shift-work[5]–related factors (leading to circadian disruption and sleep deprivation), few studies have examined the relationship between trouble sleeping or insomnia and occupational outcomes. In a study of US transportation, health care, and manufacturing industries, workers with insomnia incurred the highest productivity losses, amounting to more than $3000 per worker, even exceeding losses due to insufficient sleep.[3] A study of French employees found that, relative to good sleepers, insomniacs had 2-fold and 3-fold higher odds for absenteeism and automobile accidents, respectively.[6] Research on the relationship of insomnia to work injuries is particularly scarce, with a few exceptions. Prospective Finnish and Swedish studies of approximately 48,000 employees each, with 1-year and 20-year follow-up periods, respectively, found that self-reported difficulties sleeping (reflecting insomnia and nonrefreshing sleep for the Finnish study) were associated with increased occupational injuries,[7] including fatal ones.[8]

This issue of *SLEEP* publishes a large North American study of sleep and work injuries by Kling, McLeod, and Koehoorn,[9] based on a representative Canadian workforce sample, selected through sophisticated sampling methods. Using a cross-sectional population-based sample from the Canadian Community Health Survey of more than 68,000 part- or full-time workers, the authors examined associations of sleep difficulties to work injuries and their strength by sex and job class. The results suggest that trouble sleeping, a potential proxy for insomnia, is significantly associated with work injuries, even after multiple adjustments, especially for workers reporting trouble sleeping "most of the time" (vs "never"): injury odds were increased 25% for male and 54% for female workers. Furthermore, women seemed especially impacted by sleep-related work injuries, as reflected in their 2.5-times higher attributable fraction relative to men and their high sleep-related work injury odds for rotating and daytime shifts, across jobs categories (e.g., professional, processing/manufacturing) and with decreased sleep duration (5- < 6 h).

Conversely, the temporal relationship between injury and trouble sleeping (or other sleep problems), though modeled as a predictor, cannot be established given the cross-sectional design of this study.[9] Thus, the population attributable fraction estimation, which assumes a causal relationship, should be interpreted with caution.[10] Moreover, the injury measure employed inquired about the past year, whereas the trouble-sleeping measure did not specify a time frame, further limiting assessment of temporality. Sleep difficulties may have followed, rather than predicted, injuries. Future studies might aim to untangle the temporality and chronicity of sleep-injury associations given their likely bidirectionality (e.g., severe injuries leading to insomnia development or exacerbation resulting in poorer/slower recovery and higher re-injury risk). Other limitations of the study[9] include lack of formal interaction testing for heterogeneity (a future avenue given the present results suggested by stratification) and potentially biased injury recall for the past 12 months (with likely underreporting for less serious injuries).[11] The trouble sleeping measure combined difficulty initiating and staying asleep, perhaps diluting its association with injuries; difficulty initiating sleep best predicted (significantly) work injuries in Finnish women.[7]

These limitations, however, are offset by the fact that the study[9] uncovered "trouble sleeping" as a key correlate for work injuries among men and women in a North American workforce and expanded the discussion regarding the role of sleep in work injuries for job classes not typically considered at risk, such as sales and service jobs. Furthermore, it raises the question of sex differences in susceptibility to performance impairment associated with troubled sleep, since women were affected across a spectrum of work hours and jobs (e.g., professional and processing occupations) in which they may represent a large proportion of the workforce. In this study, the evaluation of sleep difficulties beyond the framework of sleepiness may suggest multiple pathways through which sleep may be linked to performance impairment or injury. Thus, fatigue and exhaustion, rather than daytime sleepiness,[12] may better describe the im-

Submitted for publication March, 2010
Accepted for publication March, 2010
Address correspondence to: Mihai C. Teodorescu, MD, William S. Middleton Memorial VA Hospital, 2500 Overlook Terrace, B5056, Madison, WI 53705; Tel: (608) 256-1901 x 11311; Fax: (608) 280-7140; E-mail: mct@medicine.wisc.edu

pairment of insomnia; insomnia may heighten vulnerability to subtle decrements, particularly with high cognitive load tasks.[12]

Occupational medicine has addressed several public health problems in the workplace; nevertheless, sleep disturbances continue to be neglected in work settings and workplace safety initiatives.[3] High-risk industries, particularly transportation, and tragic events (such as the Exxon Valdez spill) still receive the lion's share of attention; however, the impact of sleep on the general workforce merits due recognition. This paper[9] raises the thought-provoking question: Can preventing or mitigating trouble sleeping reduce the rate of nonfatal injuries? The outcome—nonfatal work injuries—leaves room for prevention; approaches should focus on not only the pre-injury, but also the post-injury, phase.[13] Disrupted sleep, especially chronically disturbed sleep, may impede full recovery and return to work, thereby increasing reinjury risk. Lessons from successful injury prevention programs (drinking and driving) could be applied to better identify and reach workers who are at risk for incurring sleep-related injuries. Work-time flexibility may improve health behaviors[14] and help workers with trouble sleeping caused by circadian disruption. Workplace health-promotion programs should incorporate comprehensive sleep education/practices.[3] In one study, injury rates were reduced 30% in sleepy workers following a simple educational intervention that identified the implications of sleep disorders and sleepiness on quality of life and safety and outlined treatment options.[4] Public health approaches also need to target the environment (e.g., safety legislation, environmental, ergonomic measures) to reduce the number and impact of sleep-related workplace injuries. A framework encompassing a systems approach[15] could be applied to address sleep and injury-related policies/legislation and organizational practices, encourage coalitions, educate employers and workers, promote sleep-related community education, and support individual injury and sleep-related skills and knowledge. Only through multidisciplinary efforts across environmental and occupational health/medicine, injury prevention, sleep, and—broadly—public health, can we begin to address the challenges ahead and determine the best strategies to reduce workplace injuries and improve sleep in women and men in the global workforce.

DISCLOSURE STATEMENT

The authors have indicated no financial conflicts of interest.

REFERENCES

1. Wilkins K, Mackenzie SG. Work injuries. Health Rep 2007;18:25-42.
2. 2009 Liberty Mutual Workplace Safety Index. The Most Disabling Workplace Injuries Cost Industry an Estimated $52 Billion. Liberty Mutual Research Institute for Safety 2009; Available at http://www.libertymutual.com/researchinstitute on April 5, 2010.
3. Rosekind MR, Gregory KB, Mallis MM, et al. The cost of poor sleep: workplace productivity loss and associated costs. J Occup Environ Med 2010;52:91-8.
4. Melamed S, Oksenberg A. Excessive daytime sleepiness and risk of occupational injuries in non-shift daytime workers. Sleep 2002;25:315-22.
5. Akerstedt T. Shift work and disturbed sleep/wakefulness. Occup Med (Lond) 2003;53:89-94.
6. Leger D, Massuel MA, Metlaine A. Professional correlates of insomnia. Sleep 2006;29:171-8.
7. Salminen S, Oksanen T, Vahtera J, et al. Sleep disturbances as a predictor of occupational injuries among public sector workers. J Sleep Res 2010;19:207-13.
8. Akerstedt T, Fredlund P, Gillberg M, et al. A prospective study of fatal occupational accidents -- relationship to sleeping difficulties and occupational factors. J Sleep Res 2002;11:69-71.
9. Kling RN, McLeod CB, Koehoorn M. Sleep problems and workplace injuries in Canada. Sleep 2010;33:611-8.
10. Rockhill B, Newman B, Weinberg C. Use and misuse of population attributable fractions. Am J Public Health 1998;88:15-9.
11. Warner M, Schenker N, Heinen MA, et al. The effects of recall on reporting injury and poisoning episodes in the National Health Interview Survey. Inj Prev 2005;11:282-7.
12. Shekleton JA, Rogers NL, Rajaratnam SM. Searching for the daytime impairments of primary insomnia. Sleep Med Rev 2010;14:47-60.
13. Smith GS. Public health approaches to occupational injury prevention: do they work? Inj Prev 2001;7(Suppl 1):i3-10.
14. Grzywacz JG, Casey PR, Jones FA. The effects of workplace flexibility on health behaviors: a cross-sectional and longitudinal analysis. J Occup Environ Med 2007;49:1302-9.
15. Cohen L, Swift S. The spectrum of prevention: developing a comprehensive approach to injury prevention. Inj Prev 1999;5:203-7.